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ORIGINAL ARTICLES.

ON ANOMALIES OF THE EPITHELIAL LAYER
OF THE CRYSTALLINE LENS AND
ANTERIOR POLAR CATARACT.¹

BY ADOLF ALT, M.D., ST. LOUIS, MO.

IN SPITE of all theories offered to explain the pathogenesis of anterior polar and pyramidal cataract it is still shrouded in as much mystery as is that of senile cataract. This is no doubt due to the fact, that the initial and earlier stages of the development of these diseases of the lens have been rarely, if ever, seen and studied histologically. Thus the attempts at explanation of their formation are still purely theoretical in character.

From the literature on this subject most of the observers like Hulke, Becker, Collins and others, agree on this one point, that a prolonged contact of the anterior lens capsule with the posterior surface of the cornea and the consequent interference with the normal osmotic processes through the capsule, forms the best explanation for the formation of *acquired* anterior polar cataract.

Furthermore, most observers acknowledge a *congenital* form of anterior polar cataract as distinct from the acquired form. Becker alone is strongly inclined to deny the congenital form and to assume, in apparently congenital cases, an

¹Read at the Thirty-fifth Annual Meeting of the American Ophthalmological Society, New London, Conn., July 19 and 20, 1899.

intra-uterine perforation of the cornea and contact between this membrane and the lens.

Such a contact between the cornea and lens can, as a rule without exception, take place only when the aqueous humor has been lost, and this, again, only when the eyeball, more especially the cornea, has been perforated. The most frequent cause for such a perforation is probably an injury to the cornea. Frequently the healing of such a wound is a protracted one and the anterior lens capsule remains in contact with the cornea for days before an anterior chamber is re-established, and yet, I do not know that the development of an anterior polar cataract from this cause has been observed. Certainly more frequently we see a consecutive *general* cataract developing if the injury leads to pathological changes in the deeper structures of the eye.



FIG. 1.

That a perforation of the cornea, due to an ulcerating process, may give rise to an anterior polar cataract, is a well-known fact. Yet, how small is the number of cases of ulceration of the cornea in which this takes place, when compared with the large number of cases of corneal ulceration and perforation in which no such sequel has been observed!

We know, furthermore, probably all of us, from our own personal observation, that now and then an anterior polar cataract may develop as the result of a blenorrhœa of the conjunctiva, or a keratitis, without perforation of the cornea. The formation of anterior polar cataract in such cases is explained by Hulke in the following words:

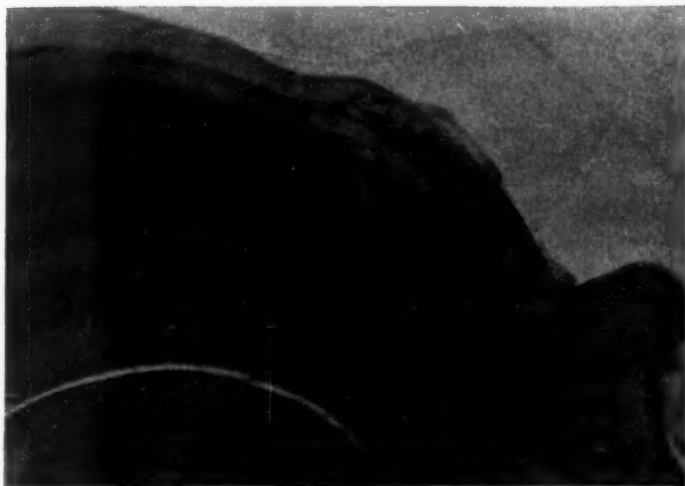


FIG. 2.

"In ophthalmia neonatorum, when the cornea has become inflamed and swollen, its posterior surface may actually come in contact with the front of the lens, and then a dot of lymph poured out upon the latter by the inflamed cornea, or even the mere pressure contact, may give rise to opacity by preventing the proper nutritional osmosis through the capsule; the little white cones which seem to project forward through the pupil in cataracta pyramidata, have their origin in this way."

I can not imagine that a cornea ever swells up so much in a backward direction that it could come in contact with, let alone press upon the lens; nor can we exactly understand how the pouring out of a dot of lymph from the inflamed, but otherwise intact, cornea can take place. Such occurrences have probably never been seen, and appear to be purely theoretical assumptions.

Hutchinson's criticism of Hulke's theory has more recently been further elaborated by Nuel, who gives his theory as follows: "In the newly-born, especially during a blennorrhœa, the pupil is very small, really only about 1 mm. in diameter. It follows, that just to that extent and corresponding to the shape of the pupil the anterior lens capsule is not protected against the afflux of phlogogenic substances by the iris, and this is exactly the place where, later on, the anterior polar cataract is located."

That later in life non-perforating ulcers of the cornea do not cause the formation of an anterior polar cataract, in his opinion, is due to the fact, that the capsular epithelial cells have arrived at a state of relative rest and are less apt to react by proliferation on similar exciting causes. When, however, the lens is bathed in pus, or when the lens, for a prolonged period, comes into contact with a cornea which is infiltrated with pus, even in the adult the resulting irritation may be sufficient to cause the formation of an anterior polar cataract.

He also assumes, that when a perforation of the cornea occurs during a blennorrhœa of the conjunctiva, even then the diffusion of these phlogogenic substances into the crystalline lens is the real cause of the subsequent anterior polar cataract.

It is my opinion, that contact between the anterior lens capsule and the posterior surface of the cornea, whether this membrane be otherwise healthy, or infiltrated with pus, even if it be prolonged, can not alone be the cause of the formation of an anterior polar cataract. If it was, it should occur at least now and then after a perforating injury of the cornea, and with more frequency and regularity after ulcerative perforation of this membrane.

Nuel's explanation of the occurrence of anterior polar cataract after blennorrhœa of the conjunctiva without corneal ulcerative perforation, by the influence of the phlogogenic substances on the part of the lens capsule exposed to them and corresponding in area with the infantile pupil, can not probably be perfectly correct in all cases, otherwise the opacity should always lie centrally, while in reality it is more frequently found to be situated excentrically.

All of these theories deal with the acquired polar cataracts. What of the congenital ones? Must we accept Beck-

er's theory of an intra-uterine corneal perforation? Surely we can not do so in cases in which several members of a family—as for instance, the father and several children, are born with anterior polar cataracts, and I know several such families from my own observation. If I remember right, Dr. J. Green reported quite a number of such cases in one family. I have also observed several times a lamellar cataract in one and an anterior polar cataract in another child of the same family, where there was no blennorrhœa, nor keratitis. There is then, surely, a congenital malformation of the lens appearing as an anterior polar cataract, which may even be transmitted by heredity.

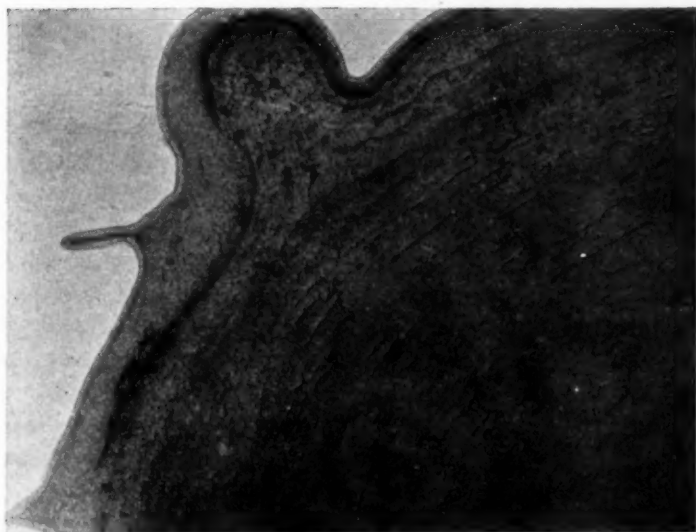


FIG. 3.

This fact, then, seems to give us a clew to a missing factor in the causation and pathogenesis of anterior polar cataract in the so-called acquired form. At the same time, it seems, this will give us an explanation of why under, as far as we can judge, very similar or even like circumstances an anterior polar cataract will develop in one case and not in another.

I mean by this, that it seems to me that for an explanation of this fact we have, in all probability, to fall back on

some congenital malformation in the lens which, perhaps, in combination with the suspension of osmosis by contact between the cornea and lens (Hulke), or with the penetration of phlogogenic substances through a perforated or intact cornea into the lens (Nuel), may bring about the formation of an anterior polar cataract. This would, of course, not exclude the possibility of the development of an anterior polar cataract from the pre-existing malformation even without the agency of the other theoretically assumed factors.

In looking through the literature on this subject I have not been able to find any observations of such congenital malformations. I have been fortunate enough, however, in the course of my microscopical studies to find four eyes from two adult male individuals which seem to furnish such a missing link.

Having obtained these eyes from the dissecting rooms, I know nothing of their history. All of them showed a dimness of the anterior lens surface when the cornea was removed, one of them, besides, a small pyramidal cataract. The eyes were removed as soon as the bodies had been obtained and preserved in a 5 per cent. formol solution, afterwards hardened in alcohol and cut into sections after embedding in celloidin. That is, they were treated exactly like a great many other eyes which showed no similar conditions, which may be taken as proof that the hardening process did not produce these conditions, a suspicion which, I confess, at first arose in my mind.

The four lenses showed such a similarity of abnormal conditions, that it is unnecessary to describe each one separately.

Instead of forming the usual single and uninterrupted layer of cells lying closely in contact with and lining the anterior lens capsule and farther back to where the young lens fibers are formed, in these lenses these cells are very irregularly arranged. In parts they are separated for a lesser or greater distance from the lens capsule by a transparent, homogenous or finely granular substance; sometimes this substance lies as well in front as behind the cells. In other sections whole portions of the cells lie closely applied to the lens capsule, while smaller portions are separated from it. Sometimes there is an almost normal lining to the capsule, while one or more rows of cells run more or less parallel to it further back. In

a large number of sections these detached cells have evidently proliferated, yet not promiscuously in all direction, but in such a manner that their nuclei form a continuous chain which, however, probably from the limitation of space and the obstacles encountered, has been forced to form the queerest reduplications and convolutions, wavy and even spiral lines, and hooks.

This abnormal and irregular arrangement of the capsular epithelium is in the different sections seen to affect all its parts, as far back even as to where the lens fibers start. In a number of sections isolated cell-convolutions are found even farther back on the inner surface of the posterior lens capsule.



FIG. 4.

In most of the sections the lens capsule has numerous folds. Where such a fold appears near the æquator the detached epithelium runs usually parallel with it, while, where the folds lie near or at the anterior pole, the epithelial layer often appears as if torn apart. This latter condition might, perhaps, be due to a shrinking of the homogeneous substance, during the hardening process, if it was, during life, of a semi-fluid consistency.

Interesting as all the lenses are, the one which showed a pyramidal cataract is, perhaps, the most interesting. In the cornea of this eye the scar of a former perforation was distinctly visible. All the sections of this lens, which do not include the pyramidal cataract, differ in no particular from those

just described. In the sections going through the small pyramidal cataract the teat-like projection of the capsule is filled with a more or less granular substance which, at the base of the cone, shows undoubted evidence of the beginning of the appearance of amorphous line. In the cone itself no epithelium lines the capsule, neither is there any epithelium visible at the base of the cone, as is often found in older cases of pyramidal cataract. But within the substance filling the cone are several convolutions of epithelial cells which take the stain but very imperfectly and are evidently disintegrating.



FIG. 5.

Like E. T. Collins, who reported 13 cases, I have had occasion to examine quite a number of lenses with pyramidal cataract, but evidently he has not, neither have I, before this seen cases in such an early, almost the initial stage.

The abnormal arrangement of the capsular epithelium in these four lenses, I am inclined to look upon as probably a congenital malformation which, other factors having been added by the perforation of the cornea, in the one lens has led to the beginning of a pyramidal cataract. In assuming this explanation to be correct, I must, of course, part with the

opinion which, with others, I hitherto held, that the lens capsule was probably formed by the capsular epithelium.

If from these few new observations I may be permitted to add a new theory to those already promulgated, in order to explain the formation of an anterior polar cataract, I would state that the prime cause probably is a congenital malformation of the lens. This malformation represents a break or breaks in the continuity of the capsular epithelium layer as well as a dissolution of contact between this layer and the lens capsule. With such a pre-existing anomaly the lens capsule would be in the same condition as Descemet's membrane after a loss of continuity in its endothelial lining; it would permit of the penetration of substances through it and into the lens in the sense of Hulke or Nuel. This penetration, in turn, might be followed by the formation of an anterior polar and pyramidal cataract.

In going further, if I am incorrect in considering the conditions described as congenital, and even where such a congenital malformation does not exist, any cause which leads to a dissolution of contact between the lens capsule and its epithelial lining, as, perhaps, a very forcible perforation of the cornea, may alter the conditions in the lens in such a manner that an anterior polar cataract may result.

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THE TREATMENT OF PROLAPSE OF THE IRIS.¹

BY F. C. HEATH, M.D., INDIANAPOLIS, IND.,SECRETARY OF INDIANA STATE MEDICAL SOCIETY; EYE AND EAR SURGEON TO THE
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PROLAPSE of the iris occurs under three conditions: First, from perforating ulcers of the cornea; second, from perforating (accidental) wounds; and, third, after such operations as the removal of cataract. The authorities are somewhat at variance as to the rules of procedure in these conditions. Formerly, it was almost the universal rule to cut off the prolapse as soon as possible, but recently, Knapp and others have advocated a more conservative course.

In the first class of cases, prolapse occurring as the result of perforating corneal ulcers, it has been found that healing takes place better by leaving the iris-mass as a sort of plug, puncturing occasionally after healing begins, if the mass protrudes much, according to the method of Noyes. Knapp has made it a rule never to cut or burn off the protruding iris in infective conjunctival or corneal disease lest the infection be let into the eyeball. He has never seen sympathetic trouble from prolapse where the iris had not been wounded by accident or by the hand of the surgeon.

On the other hand, there are many authorities that advocate cutting or burning off the projecting mass, either early (Fuchs, de Schweinitz) or after healing has taken place (Fick). As a rule, attempts to replace the iris or reduce prolapse with atropine or eserine fail.

In perforating wounds of the cornea, it is almost the universal rule to abscise the prolapse at once, unless the prolapse can be replaced and kept in place by atropine or eserine. Noyes says that successful abscission is feasible a week or even ten days after the injury, and Nettleship finds it seldom possible to return or reduce prolapse by manipulation; atropine or eserine even an hour or two after the injury. Knapp has recently shown that in prolapses of this class also a conservative

¹Read before the State Medical Society, June 2, 1899.

course may be safer and cleaner than the operative procedure, at least in certain cases. He finds that perforating wounds of the sclerotic heal kindly, but prolapse of the ciliary processes require excision—otherwise they leave cyst-like ectasia.

Of the third class, prolapse after cataract operations, Noyes says: "The treatment of prolapsed iris is not fully settled; Gayet leaves it to itself, and I have seen satisfactory results by so doing. Most operators excise it as soon as discovered; but this must be done not sooner than the fourth nor later than the twelfth day."

Knapp, however, advocates immediate excision within the first twenty-four hours after the operation, and, even in cases of incarceration of the iris without protrusion, performs iridectomy at once to prevent prolapse, excessive reaction or astigmatism after healing—thus being more radical than most operators in this class of cases, although more conservative in the other classes.

Fuchs makes it a rule to do a small iridectomy in all operations for extraction of cataract, claiming that it prevents prolapse as well as a large iridectomy, and that has proven true in the few cases in which I have tried the method.

A brief citation of some cases from my case-book will serve to show my views on this subject and some lessons may be derived from their consideration.

CASE I.—Mrs. B. Large prolapse from perforation of corneal ulcer in gonorrhœal ophthalmia. This was about ready to perforate when I first saw it. Healing took place quickly under a conservative course of treatment, but the vision was poor from the size and position of the scar. The other eye had never been affected by any sympathetic trouble when last seen, two years later.

CASE II.—Mrs. G. Small prolapse from perforating ulcer in gonorrhœal ophthalmia. Good healing under antiseptic treatment with alternate use of atropine and eserine. Scar not being central, vision was nearly normal.

CASE III.—Mr. V. Small prolapse from ulcer, healing under antiseptic treatment after paracentesis of cornea. Vision fair only, affected considerably by scar. Other eye normal four years later.

In this class of cases it will be seen that I am in full accord with the views of Knapp, above quoted.

CASE IV.—Mr. H. A scleral cut just above the upper and outer margin of the cornea. Iris protrusion cut off two days after the injury. Marked reaction followed, considerable œdema of ocular conjunctiva, intense injection of blood-vessels, floating bodies in the vitreous, etc. Although the inflammation finally yielded to treatment, with pretty good vision, I am satisfied that the result would have been as good and the patient saved considerable suffering and annoyance, had the iris protrusion been left to Nature.

CASE V.—Mr. B. Protrusion of iris from corneal cut near sclero-corneal junction. Healing took place under conservative treatment with iris adherent to scar, but vision was nearly normal.

CASE VI.—Master T. W., aged 9 years. Cornea pierced by sharp stick half way between pupil and upper corneal margin. Iris protruding and too firmly adherent to loosen without extensive operation. The family physician opposed giving a general anæsthetic as the child was just recovering from an attack of congestion of the lungs. The protruding iris was snipped off, under cocaine, with as little traction as possible. Healing took place quickly with no reaction to speak of, and practically normal vision. The slight operation in this case should be regarded as a conservative measure and was probably better than either leaving it to Nature or doing the more extensive operation necessary to fully loosen the adherent iris.

These three cases are given to illustrate the advantages of conservatism in cases of prolapse from accident, but the last one also brings out the point that we should not adhere blindly to any rule.

In prolapses of the third class, those occurring after cataract operations, my practice has been to follow a very conservative course.

CASE VII.—Miss B. Small prolapse discovered 48 hours after extraction of cataract; it increased considerably for a day or two and then remained stationary. Healing followed quickly, with slight reaction and fair vision. No atropine was used in this case. This statement is made because some operators believe the atropine often produces or increases the prolapse.

CASE VIII.—Mr. P. Operation done at Anderson, Ind.

He was seen three days later, when there was a medium-sized prolapse which had increased markedly when seen again one week later, atropine having been used. This prolapse was so large that I thought an operation would certainly be necessary, and that was the opinion of a distinguished colleague to whom I described the case. But, by his advice, the operation was deferred until all inflammatory symptoms had disappeared and by that time the epithelium had formed over the prolapse and the cicatrix contracted and flattened down with perfectly smooth healing so that operation was not necessary. This shows what Nature will sometimes do in cases that look very unpromising. Although healing was slower in this case than usual, and reaction and resulting astigmatism (from changes in corneal curvature) greater than after an uncomplicated operation; yet the final visual result, with correcting glasses, was excellent $=\frac{15}{xxx}$ for distance and finest newspaper print read easily at 10 inches. Although an early iridectomy might have brought quicker healing, less reaction and less astigmatism, it could hardly have produced better visual result and might have caused loss of the eye by infection, which sometimes happens despite the most careful aseptic and antiseptic precautions.

While these cases illustrate the possibility of good results from extreme conservatism in prolapse after cataract operations, still, when we consider with how little traumatism the iris may be cut within the first 24 hours, how slight the danger of infection when done with careful attention to asepsis and antisepsis, and how great the gain in time of healing, prevention of suffering, etc., there is strong reason to believe that Knapp's rule to immediately abscise all actual prolapses discovered by the end of the first day after the cataract extraction, is in the line of good surgery.

On the other hand, my experience leads me to reject his advice to perform iridectomy in incarceration of the iris without actual protrusion, as I have never seen, in such cases, any impairment of vision, increased reaction, or any unfavorable symptoms whatever. I have one such case in mind, in which the visual result was nearly $\frac{20}{xx}$. It would seem that the procedure, at least in such cases as I have observed, would have subjected patients to unnecessary suffering, annoyance and danger. It seems hardly necessary to detail cases in support of this position or even for illustration, as the statement above made embodies the important teaching from them all.

I desire, however, to remark in this connection that all the cases cited in the paper are for the purpose of illustration rather than to establish principles or form the basis for laying down ironclad rules, which would require not a few cases merely, but statistics embracing the experience of all competent observers.

The object of this paper is to emphasize the conservatism of Dr. Knapp regarding treatment of prolapse in cases of perforating ulcer and accidental wounds of the cornea, and to add a plea for still further conservatism, at least in cases of incarceration of the iris in the wound after cataract operations.

SYMPATHETIC OPHTHALMIA CAUSED BY GLIOMA RETINÆ.¹

BY ADOLF ALT, M.D., ST. LOUIS, MO.

SEPTEMBER 2, 1898, Leland J., 5 years old, was led into my office by his father and a medical student, from whom the following previous history of the case was had:

In the spring of 1896 ($2\frac{1}{2}$ years previous to this visit), the parents accidentally discovered that the boy's left eye was blind. They had never before noticed any inflammatory symptoms in that eye and they attributed the blindness to the fact that during the preceding summer the child had had, what they called, a "sun-stroke." About a year, after the blindness had been discovered, the eye became at times injected and painful. Finally, about a year previous to their visit to my office the eye was removed by their family physician, as they stated, to save the fellow-eye. The symptom which induced the physician to operate and the parents to consent, was a severe and uninterrupted photophobia of the right eye. In spite of the removal of the left eye, the right eye had since continually grown weaker, and had been blind for about two weeks when I saw the case.

It was impossible to get any history of injury to the left

¹Read at the Thirty-fifth Annual Meeting of the American Ophthalmological Society, New London, Conn., July 19 and 20, 1899.

eye, nor could the father give any further description of the disease which caused the destruction and removal of the left eye. Before seeing me they had just consulted an oculist, who had declared that nothing could be done for the boy, and they brought him to me to see whether I was of the same opinion.

Status præsens.—The left orbit showed nothing abnormal.

The right eye was somewhat photophobic, sufficiently so as to force the boy to turn his head down and away from the light. There was a roseate zone of injection around the corneal periphery, in the anterior layers of the cornea a slight band-shaped opacity ran from periphery to periphery in the horizontal meridian. The anterior chamber was shallow; there was some exudation in the pupillary area and a total posterior synechia of the discolored and atrophic iris. The iris periphery was pressed forward. Atropine, which had been instilled for many months, had had no effect on the condition of the pupil. The ciliary region, especially upward, was painful to slight pressure. No reflex could be obtained from the fundus, Tension was good. Vision was reduced to rather doubtful perception of light.

History and *status præsens* made the diagnosis of sympathetic ophthalmia certain.

Without holding out any definite hopes, I advised continued treatment with mercury and iodide of sodium.

This advice was complied with religiously, the mercury being given internally and by inunctions alternately.

December 6, 1898, the patient was again brought to my office. While the visible conditions of the eye had apparently but little altered, the boy could now count fingers promptly at six feet. The photophobia had disappeared, and the father, who was very happy, told me that the boy was playing about while at home, looking at large pictures, and so on. There was a little better reflex to be seen with the ophthalmoscope, but the crater-shaped pupil was still the same. Yet, besides in his vision, the boy was greatly improved in his general health and altogether the case now looked very hopeful.

I ordered the same treatment to be continued.

May 23, 1899, the boy was again brought to me. He now walked into my office alone and counted fingers at eight feet promptly. However, the child looked bad and appeared weak.

While the right eye seemed little changed, I found in the left orbit a tumor, apparently attached to the periosteum of the lower wall, elastic, round, of a slightly yellowish color and the size of a nut. A little farther back in the orbit and on the inner wall was a smaller round tumor of the same appearance. The father had detected the presence of the large tumor only a week before.

At the first glance these tumors struck me as being gliomata. The examination of the enucleated eye was now of prime importance. The father managed to procure it for me, and I promised to advise his physician of what I should find, as he would not consent to have me remove the orbital tumors. This has been done by their family physician, Dr. H. W. Latham, of Latham, Mo., who kindly sent me a part of the large tumor.

As I had suspected, the primary affection was an intraocular glioma exophytum, the walls of the eyeball being still intact at the time of the enucleation. Yet the optic nerve was gliomatous as far back as where it had been cut off. The secondary tumor removed from the orbit was also a glioma.

In his last letter the family physician wrote me that the boy was failing very fast, and comatose most of the time. Thus the end seems near at hand.

Aside from its sentimental and tragic attributes, the case is to me especially interesting first, on account of the fact, that a glioma produced sympathetic ophthalmia and, secondly, on account of the marked improvement of vision in the sympathetically affected eye, which later on might, perhaps, by surgical means, have been still further improved.

Sympathetic ophthalmia, due to an intraocular tumor has been observed before, but the cases are not very numerous. The case here related is the first of this kind in my personal experience.

The fact that a sympathetically affected eye may sometimes be improved by continued mercurial treatment is well-known also; yet, in my experience, this happy result has only occurred a few times. I think that a syphilitic diathesis which might in some cases be thought of as causing an apparent sympathetic ophthalmia as well as in explanation of the improvement under treatment, could absolutely be excluded in the case under consideration.

MEDICAL SOCIETIES.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

THIRTY-FIFTH ANNUAL MEETING, HELD AT NEW LONDON,
CONNECTICUT, JULY 19 AND 20, 1899.

ABSTRACT REPORT BY H. O. REIK, M.D., BALTIMORE, MD.

The meeting was called to order by the President, DR. O. F. WADSWORTH.

A Description of the Reflecting Phorometer and a Discussion of the Possibilities of Torsion in the Eyes, by DR. F. H. VERHOEFF, Baltimore. (Presented by invitation of the Society).

The instrument differs from other phorometers in that mirrors are used in place of prisms, thus permitting the greatest simplicity in construction together with the most advantageous movements in the apparent images. There are four mirrors, two for each eye. By turning a milled screw, the lower mirrors may be made to rotate toward or away from each other so as to produce lateral separation of the images. It is to be noted that this arrangement produces equal though opposite movements in the two images. Vertical separation of the images is produced by rotation of one of the upper mirrors.

The parallel test of Duane has been adapted to this instrument, and a very important feature of this phorometer is a shutter which slides back and forth before the eyes so that, when in use, the patient can see with but one eye at a time. The shutter is moved back and forth very quickly, a pause being made, however, before each eye, so that time is given for the after-image to disappear, and the patient is asked to state whether the object moves or not. If he sees the object apparently moving obliquely, the upper mirror is adjusted until the movement is horizontal, and then the lower mirrors are

adjusted until practically all movement is overcome. Both the amount of hyperphoria and also esophoria or exophoria, if present, will be indicated upon the scales. It is thus possible, by means of the reflecting phorometer, to determine the amount of heterophoria either by the diplopia test or by the shutter test, and, in addition, the amount of abduction, adduction and right or left sursumduction may be readily obtained.

By means of a special chart, consisting of two rotary discs placed one above the other, the instrument may be used to determine and measure any possible torsional deviation in the eyes. It was shown that by means of the instrument an artificial torsion could be produced in the retinal image of any object regarded. In this way it was determined that the eyes can bear, without discomfort, a tilting of the retinal images in the two eyes equivalent to a torsion of 8° .

Four experiments were described to prove that torsional combining power or an ability to so rotate as to overcome artificially produced declinations and cyclophoria, do not exist. Since the fusion of lines situated upon non-corresponding points of the retinae is not due to torsion of the eyes, it was spoken of as being due to psychical compensation.

DR. VERHOEFF believes that the existence of a torsional combining power has been assumed by Stevens without sufficient evidence, and that Savage has fallen into error in assuming the existence of cyclophoria.

Congenital Inefficient External Rectus and Binocular Vision,
by DR. J. O. TANSLEY, New York,

The patient was a strong, healthy young man. Asking him to look at and follow a pencil it was seen that the left eye had perfect motility but that the right eye, although it had perfect movement upward, downward and nasally, could not be moved quite to the median line outwardly. He had binocular single vision in any part of the left field, but a pencil held directly in front of him appeared double, and the farther it was moved to the right the greater was the diplopia. The diagnosis was congenital absence or atrophy of the right internal rectus. A tenotomy was performed upon the right internal rectus in the hope of overcoming the necessity of turning the head to the right, but the conditions were not much improved.

A second case was reported in which the patient always turned his head to the left or eyes to the right when doing close work. Examination showed that he could not rotate the left eye outward quite to the median line. All other movements were normal. The condition here also seemed to be congenital atrophy or absence of the external rectus.

A Case of Primary Tumor of the Optic Nerve, by DR. F. BULLER, Montreal, Canada.

The patient was a boy, 6 years of age, in good health, save for some slight nervous disturbances. The right eye presented a high degree of proptosis, and the exposure caused constant irritability of the eye. The ophthalmoscope showed the optic nerve entrance apparently much larger than normal, of a pale bluish white tint with oval outline and irregular margins. Palpation revealed within the orbit a large, somewhat elastic mass without distinct outline. These symptoms, together with the complete blindness, pointed to the presence of a tumor involving, if not originating in, the optic nerve. Removal was attempted by severing and drawing aside the internal rectus, but it became necessary to enucleate the eye with the tumor mass which surrounded the optic nerve. The patient made a good recovery and one month later was reported to be in good health and quite free from nervous attacks.

A pathological study of the tumor showed that it belonged to that class usually described as myxo-sarcomatous, but the changes in the optic nerve, at least, are to be looked upon as due to a chronic distension of the lymph spaces, and it is suggested that possibly the whole condition was due to some localized disturbance of the lymphatic system.

DISCUSSION.

DR. REEVES said that he had seen last summer an interesting specimen in the Birmingham Ophthalmic Hospital of a tumor of the optic nerve from a patient who had excellent, if not normal vision.

DR. BULLER stated that this was the third case he had seen, and he had considered the loss of vision with complete optic atrophy one of the diagnostic features of optic nerve tumors.

A Case of Primary Non-pigmented Sarcoma of the Left Upper Lid, by DR. C. A. VEASEY, Philadelphia.

The patient was a Polish tailor, 45 years of age, who had observed a small growth on his eyelid four months previous to his visit. It resembled a chalazion in many respects and was adherent to the overlying skin but moveable over the tarsus. It was dissected out and the microscopical examination showed it to be an encapsulated non-pigmented spindle-celled sarcoma. A review of the literature discloses the records of only about 50 cases of sarcoma of the lid, 38 per cent. of which were spindle-celled, 38 per cent. round-celled and 24 per cent. mixed.

An Instrument Intended to Facilitate the Operation of Capsulotomy, by DR. F. BULLER, Montreal, Canada.

The instrument consists of two needles exactly parallel with each other, not more than 0.25 mm. in diameter and exquisitely sharp. It is to be used in the following manner: First, the pupil is dilated, if possible with atropine, then a careful inspection is made by focal illumination to find the weakest and the strongest parts of the capsule to be divided, bearing in mind that the aperture to be made must be as nearly as possible, central. The double needle is passed through the cornea at any convenient point to the central edge of the denser portion of the capsule and the Knapp needle-knife passed through the sclero-corneal junction to the line of its incision through the thinnest part. This incision being completed, the cutting needle is then passed between the limbs of the double needle and made to cut the denser capsule by one sweep. The double needle is to be withdrawn first, and then the cutting needle.

The advantages claimed are a large, clear central aperture, without traction on the zonule, and very slight reaction.

DISCUSSION.

DR. STANDISH said that he had tried some years ago to use a double needle in this way, but had found considerable difficulty to cut the capsule without pushing it before the instrument, and he had abandoned the method. He thought it difficult to make equal pressure with the two limbs of the needle, and, therefore, one frequently entered while the other did not.

DR. BULLER stated that he did not attempt to cut the capsule with the points of the needle but merely exerted enough pressure to steady the capsule.

Case of Expulsive Intraocular Hæmorrhage After Preliminary Iridectomy for Cataract, by R. L. RANDOLPH, Baltimore.

The accident occurred on the third day after an iridectomy preliminary to cataract extraction. The patient was 76 years of age, in good health, and had a mature cataract in the right eye and commencing opacities in the left. Iridectomy was performed with perfect satisfaction and for two days the patient did well. On the third day she suffered a great deal of pain, and on inspection it was found that the corneal wound was bulging, the anterior chamber was obliterated, the lens was pushed forward and the iris was resting against the posterior surface of the cornea. On the following day it became necessary to extract the lens, since the condition was steadily becoming worse, and no sooner was the section completed than the lens was ejected with great force and a mass of vitreous immediately followed. The corneal flap was replaced and a shrunken eyeball resulted.

In the course of six months glaucoma of the left eye set in and in spite of treatment advanced rapidly to blindness. It was not thought wise to attempt an iridectomy in view of the experience with the right eye, but the pain became so intense that paracentesis of the vitreous was performed twice, and although the eye remained hard, the pain entirely disappeared.

The development of the glaucomatous condition of the left eye seems to justify the conclusion that the same condition was present, in a milder stage, in the right eye at the time of operation.

DISCUSSION.

DR. FRYER said he had met with several cases of hæmorrhage after cataract extraction, and he thought it interesting to note in this case that the very slight change of pressure following an iridectomy could produce a hæmorrhage in these cases that are so predisposed.

DR. SUTPHEN reported a case of hæmorrhagic glaucoma in which he had undertaken to make an iridectomy but had a

profuse hæmorrhage, with loss of vitreous, and final destruction of the eye.

DR. CARMALT asked if any examination of the kidneys and of the arterial system had been made in these cases.

DRS. RANDOLPH and FRYER both replied that they had made urinary analyses without finding albumen.

DR. MILLIKEN reported a case of hæmorrhage occurring on the sixth day after extraction, without serious results; the hæmorrhage gradually clearing up.

DR. REEVE referred to a case in which he had operated upon the eye successfully by first doing a paracentesis, then an iridectomy and, finally, extraction, with good results.

DR. WADSWORTH reported a case of profuse hæmorrhage after iridectomy, which compelled him to abandon his operation. The wound healed perfectly, however, the hæmorrhage cleared up and extraction was done later.

Retinitis Albuminurica as a Factor in the Causation of Secondary Glaucoma, by DR. C. S. BULL, New York.

The connection between retinal hæmorrhage and secondary glaucoma is recognized by all, but the connection between retinitis albuminurica and secondary glaucoma does not seem to be so clearly recognized. The connecting link is probably more or less extensive disease of the walls of the blood-vessels, which may be regarded as a common cause of both the retinitis and the hæmorrhages. It is generally conceded that interstitial nephritis is the variety usually accompanied by retinal hæmorrhages, and in this form of nephritis the general constitutional symptoms vary greatly in different cases. Albuminuria, the most certain sign, is occasionally absent, and when present, is slight in amount and not easily detected. Two symptoms, however, are rarely absent, and these are cardiac hypertrophy, with a doubling of the first sound and certain cerebral phenomena. The most frequent head symptom is a continuous frontal or occipital headache. When these symptoms are found the urine should be subjected to frequent analysis.

In looking over the literature of hæmorrhagic glaucoma I find that many of the published cases were marked by these symptoms. In almost all the cases of secondary glaucoma, preceded or accompanied by retinal hæmorrhage and exuda-

tion, it is quite impossible to decide whether the glaucoma is really secondary to the hæmorrhage or whether the two are simply associated together.

DR. BULL then reported in detail four cases of acute glaucoma following exudative retinitis albuminurica.

DISCUSSION.

DR. PROUT suggested that possibly we could gain some knowledge of the cause of glaucoma if we could follow up a number of cases and see what the patients eventually die of.

DR. WADSWORTH reported one case of secondary glaucoma in both eyes in which he had been able to follow the patient's history until she died, of acute pneumonia, but at no previous time had she been the subject of any discoverable disease.

DR. HOWE brought up the question of heredity as a factor in the causation of glaucoma, and reported one family with eight cases of secondary glaucoma in three generations.

DR. MITTENDORF said, concerning heredity, that the Hebrew population is extremely prone to this disease.

On Anomalies in the Epithelial Layer of the Crystalline Lens and Anterior Polar Cataract, by DR. ADOLF ALT, St. Louis. (See page 225, this issue).

DR. ALT reviewed the various theories concerning the origin of anterior polar cataract and said: It seems to me that contact between the anterior lens capsule and the posterior surface of the cornea, whether this membrane be otherwise healthy or infiltrated with pus, even if it be prolonged, can not alone be the cause of the formation of an anterior polar cataract. If it was, it should occur at least now and then after a perforating injury of the cornea and with more frequency after ulcerative perforation of this membrane.

He was not inclined either to accept the theory of intra-uterine corneal perforation as an explanation of the congenital cases, in view of the fact that heredity seems to play such an important part in their history. As a result of his examinations of a number of eyes he is inclined to believe that the prime cause of the formation of an anterior polar cataract is some congenital malformation of the lens, and that this represents a break in the continuity of the capsular epithelium layer

as well as a dissolution of contact between this layer and the lens capsule. With such a pre-existing anomaly the lens capsule would be in the same condition as Decemet's membrane after a loss of continuity in its endothelial lining, and this would permit of the penetration of substances into the lens, which might be followed by the formation of cataract.

A Method of Converting the Alternating Current for Use in Connection with the Johnson Magnet, by DR. W. B. JOHNSON, Patterson, N. J.

The portable electro-magnet devised by the author and described in the May number of *Knapp's Archives*, is only of use in connection with a direct electric current of 110 or 120 volts, and consumes $\frac{1}{2}$ -ampere of current. Municipal lighting in many cities is accomplished entirely by the alternating current, and as some means of converting this into a direct current is essential to the adoption of this or any other magnet for general use, the following method is suggested:

A $\frac{1}{4}$ -horse-power fan motor, adapted to the alternating current, is fitted with a pulley, belted at a distance of 3 feet to a pulley attached to a $\frac{1}{6}$ -horse-power fan motor, wound for the direct Edison current; the speed of the motors must be the same. The Edison motor acts as a generator and furnishes the $\frac{1}{2}$ -ampere of current at 110 volts necessary to fully saturate the core of the magnet. The probable cost of such an appliance would be about \$50.

The Johnson magnet was exhibited and is offered as a substitute for the Haab magnet, being less cumbersome, equally as strong, portable and more easily adapted to use in cities having alternating currents, as it requires only $\frac{1}{2}$ -ampere of current, while the Haab requires 10 or 12, and needs a motor and generator of several horse-power.

Report of Three Cases of Magnetic Extraction of Steel from the Eyeball Through the Point of Entrance, by DR. W. B. JOHNSON, Patterson, N. J.

In all three cases large pieces of metal were removed from the eye without difficulty by the Johnson magnet. In every instance considerable pain was produced as the magnet first approached the eye, and in the second case the wound of entrance, having become partially closed, had to be enlarged.

The largest piece of metal was $\frac{3}{8}$ of inch long by $\frac{1}{8}$ of an inch in width.

DISCUSSION.

DR. HOWE said that he had had some difficulty with other magnets in that when the foreign body was drawn up to the wound it was scraped off as the magnet was withdrawn.

DR. HOLT said that he had been able to overcome that difficulty by having an assistant open the edges of the wound with a small Stevens' strabismus hook.

DR. JOHNSON suggested the advisability of enlarging the wound of entrance before attempting to remove the bit of metal from the vitreous.

DR. HARLAN spoke of the necessity for attempting the removal as soon as possible after the injury and before the foreign body can be bound down by exudative material.

A Cyst of the Vitreous (with patient), by J. O. TANSLEY, New York.

On ophthalmoscopic examination a floating spheroidal body about the diameter of the optic disc could be seen in the center of the vitreous chamber. When the eye was quiet it slowly settled to the lower part of the cavity and remained there in contact with the retina, but the slightest movement of the eyeball caused it to move rapidly about. The cyst had a distinct capsule which was pigmented in spots, and the spots on the posterior capsule could be seen through the transparent anterior capsule and cyst contents. It was apparently benign.

DISCUSSION.

DR. ALT suggested that it might be one of the adomatous tumors of the ciliary process, described by him which, having undergone cystic degeneration, had become detached.

DR. RANDALL thought it more likely a detached cyst, as are occasionally seen at the edges of a coloboma, and which had been set adrift by a process of closure of the congenital cleft.

A Case of Sympathetic Ophthalmia Due to Glioma Retinæ in the Fellow Eye, by DR. ADOLF ALT, St. Louis. (See page 238, this issue).

This patient, a boy of 5 years, had one year previously

had the left eye removed because it was blind and was the source of irritation to the right eye. When seen by Dr. Alt, there was well-marked sympathetic ophthalmia, with blindness in the right eye. After treatment with mercurials and iodides a marked improvement took place in the eye so that the boy was able to count fingers at eight feet, but his general condition did not improve, and in a few months two small growths appeared in the left orbit. The enucleated globe was obtained, and an examination of it, as well as pieces of the new growth, showed gliomatous tissue. Cases of sympathetic ophthalmia, due to intraocular growths, are rather uncommon.

Cases of Metastatic Panophthalmitis, by DR. B. L. MILLIKIN, Cleveland, Ohio.

Case 1 was one of typhoid fever with monocular irido-chorioiditis and severe earache and headache. Although there was no autopsy it seems likely that the panophthalmitis in this case was caused by extension from some meningeal involvement.

In case 2 there was monocular panophthalmitis, probably due to septic endocarditis, although the systemic diagnosis was not certain.

In case 3 there was binocular panophthalmitis in connection with a fatal pneumonia. In the second and third cases it is probable that the eye disease was embolic in character.

DISCUSSION.

DR. FRYER said that these metastatic cases would seem to be due to some peculiar forms of sepsis. During the Civil War he had seen a large number of cases of pyæmia, but remembered only one case in which there was metastatic trouble within the eyeball.

DR. RANDOLPH referred to a case which he reported three years ago of panophthalmitis occurring in a child, 9 months of age, and in whom it was impossible to determine the cause for the disease. The only disease the child could have had was possibly la grippe.

A Case of Spontaneous Rupture of the Eyeball, by DR. B. L. MILLIKIN, Cleveland, Ohio.

The patient, a woman, aged 68 years, had for a number of years complained of neuralgic attacks in the head. In Janu-

ary, 1896, she had an acute attack of pain in the left eye and within a week a similar attack in the right. There was rapid loss of vision, and since then she has been blind. The tension in both eyes was +3.

On January 4, 1898, while sitting quietly in her own room she had an acute attack of pain in one eye, followed immediately by spontaneous rupture of the globe and profuse hæmorrhage. The rupture was a nearly vertical one through the center of the cornea from the lower margin of the pupil upward into the sclera.

AFTERNOON SESSION.

Multiple Rupture of Sphincter of the Iris with Subsequent Development of Myopic Astigmatism, by DR. W. F. MITTENDORF, New York.

In this case there were six distinct ruptures of the pupillary border, and no unusual dilatation of the pupil except at the seat of the ruptures. After the injury had healed a myopic astigmatism of 3D. was observed, with the axis of the cylinder in the direction of the most pronounced rupture. The eye was apparently normal before the injury and the ophthalmometer showed a normal cornea afterward, so that the astigmatism must have been lenticular.

Normal Pupillary Reaction, with the Microscope for Its Measurement, by DR. LUCIEN HOWE, Buffalo, N. Y.

In regard to the measurements in pupillotomy, those made with the naked eye are entirely unreliable. The ophthalmometer requires too bright a light, and the best form of instrument is that in which the scale is fixed in the tube of a microscope or of a telescope. The instrument here presented, made by De Zeng, gives us a great amplification, with a flat field, and the slightest variation in the size of the pupil can easily be detected and measured. This instrument had already been described by the writer as a microscope for viewing the eye.

The Value of Acoin as a Local Anæsthetic in Eye Surgery, by DR. R. L. RANDOLPH, Baltimore.

In January, 1899, Trolldenier, of Dresden, published a report of experiments upon rabbits with a new anæsthetic,

namely, acoin, using it both in powdered form and in solutions of varying strengths. Dr. Randolph has tried this preparation in solutions of 1 to 100 and 1 to 300 upon the human eye and finds in many respects it is not as satisfactory as either cocaine or holocaine. For instance, if the eye be congested or irritated, repeated instillations even will not give satisfactory anæsthesia; it produces rather more stinging than the other anæsthetics named and is not so rapid in action. It does not affect the accomodation, and a few experiments made seem to indicate that organisms can not live in a solution of it.

DISCUSSION.

DR. HOWE objected to the inaccurate methods of expression we are drifting into concerning the effect of local anæsthesia, and called attention to an article published by him some years ago in the *Archives*, explaining a method by which we can obtain a numerical expression of local anæsthesia by means of electricity.

More Uniform Tests for Vision, Color-Sense and Hearing, by DR. C. H. WILLIAMS, Boston.

In re-arranging the tests for one of the New England railroads, Dr. Williams found it necessary to have a new set of letters carefully drawn, so that the height of each letter should subtend the standard visual angle of five minutes, and the width of a component parts an angle of one minute, as shown by Prof. Snellen to be the angle at which letters should be easily read by the normal eye. In order that these cards should be in a portable shape, the letters were printed on cards $3\frac{1}{2}$ by 9 inches, which can be readily placed in an envelope that will go into the coat pocket. One line of letters only was printed on each card, and a different arrangement of letters for each of the required distances of 20, 30 or more feet; was adopted for each card in order to prevent memorizing. Another feature of these cards is the addition of three cards on which are printed representations of the ordinary semaphore arm signals, the length and the width of the arms being the same as the height and width of the letters on the 20-foot card, and when seen at a distance of 20 feet they correspond in size to the apparent size of a standard semaphore arm, 46 inches long and 7 inches wide, when seen at a distance of a $\frac{1}{2}$ -mile.

There is need of greater uniformity in the tests used for the color-sense, and it is stated as a general proposition that no test for color-perception is satisfactory unless it concludes first a test by comparison of colors, the Holmgren worsted test being, perhaps, the best; and, second, a test with colored lights, in which the intensity of the lights can be varied, and in which the names of the colors shown should be given by the person examined.

DR. WILLIAMS then exhibited a lantern which he had devised for making this test with colored lights, and to show the danger of relying on one test, reported some cases which had passed the confusion color-tests with worsted but failed with the lantern-test. With the lantern it is possible to detect a very small central color defect which would not be noticed when testing with the worsteds, because their image would cover a larger area than that affected, and hence; would be recognized.

In order to have a more uniform test for hearing, a ratchet acoumeter has been devised which produces a series of sharp metallic sounds by turning the milled head.

In regard to the use of spectacles by train, engine or yard men, there can be no objection to their use for reading train orders, etc., but for distant vision, for the proper reading of signals which may be rapidly approaching, and under all the the varying conditions of the weather, such as fog, rain and snow, it will be found that when the need of assistance from the glass is the greatest, they will often be a hindrance rather than a help; the moisture condensing on the glass will obscure the vision, and the tendency will be to remove them and depend upon unaided sight.

Although it may be a hardship in some cases, it will be safer to require for the re-examination of men in the service a vision of not less than $\frac{20}{xxx}$, with both eyes open, without glasses, for enginemen and firemen, and a vision of not less than $\frac{20}{xl}$ under the same conditions for others engaged in operating trains.

A Modified Perimeter, by DR. C. H. WILLIAMS, Boston.

This consists of the ordinary self-registering perimeter with electrical attachments, small incandescent lights being used both for fixation and for the movable point on the arc.

PROCEEDINGS OF THE OPHTHALMOLOGICAL
SOCIETY OF THE UNITED KINGDOM.

FRIDAY, JUNE 9, 1899.

H. R. SWANZY, F.R.C.S.I., President, in the Chair.

SPECIAL MEETING.

THE OPERATIVE TREATMENT OF MYOPIA.

A discussion on this subject was opened by Mr. F. Richardson Cross. He said that in the higher degrees of myopia they had to deal with a serious defect of vision which might not be of great importance to the educated, or to those engaged in fine work, but which to the ordinary laborer or handicraftsman might mean unfitness to earn a living by reason of the limit in his range of vision. Patients with high myopia, besides suffering in various ways from pain and discomfort, might be subject to increase in the myopia and a continued deterioration of the tissues of the eyeball from stretching or tearing of the choroid, inflammation or hæmorrhage in the eye, and from detachment of the retina. Moreover, with full optical correction of the myopia the visual acuity was more or less diminished, and also the glasses which gave full correction could not be often worn with satisfaction. After a historical review of the subject the author went on to speak of the operation as now practiced, and referred to the communication of Fukala to whom the credit of establishing the present operation was due. Fukala claimed the following advantages for the operation: It gives distinctness of vision for distance, and improves visual acuity. It enables patients to work at the distance of ordinary useful sight without glasses, or with glasses easily borne, and improves the position of the head and body. It enlarges the retinal images, and allows of more light falling on the retina. It simplifies the optical apparatus of the eye. It removes the strain of accommodation and lessens the tendency to further increase in myopia. It improves the condition of the tissues of the eye.

Proceeding to methods, Mr. Richardson Cross said that

the removal of the lens was the only operative procedure likely to be of use, and the way of removing the lens was by discission and subsequent evacuation of the lens in the young, in whom the operation was most frequently necessary. In older patients, or where the condition of the eye was unsatisfactory, iridectomy followed by discission before extraction would be preferable. Some authors advocated repeated small discissions without evacuation, others practiced very free cutting up of the lens and capsule. Mr. Cross thought discission should be limited to the anterior portion of the capsule, as a rule, to avoid deep swelling of the lens within its capsule; evacuation of the swollen lens-matter by the curette should be done within a few days before tension of the eye came on. He had used the suction syringe for removing the lens débris in some cases. Well-marked disease of the vitreous, or tendency to intraocular hæmorrhage, or softening of the globe, or some kinds of impairment in the visual fields were contra-indications of the operation. Choroiditis or macular changes, unless hæmorrhagic, were not against the operation. Certain incidents were unfavorable, as prolapse of the vitreous after laceration of the posterior capsule; septic infection was likely to occur after prolapse of the iris; the puncture of the anterior chamber should be small and peripheral to avoid this. Detachment of the retina as a consequence of the operation probably was less frequent than had been thought; but still detachment of the retina, judging from statistics, was rather more likely to occur after operation in myopia than in eyes which had not been touched.

The results of operation in 48 cases were appended, and the author stated that he did not regret interference in a single case. The greatest amount of myopia was 25 D. and the lowest 7 D.; the latter were very young patients in whom the myopia was progressive. As a rule, we should not operate where the myopia was less than 15 D. He always operated on the worse eye, and, as a rule, on one eye only, the best eye being left untouched for reading purposes, while the operated eye was used for distant vision. The evidence of the sufferers from myopia who had been operated on had been, almost without exception, favorable to the operation, and they were conscious of the advantage they had gained.

MR. HARTRIDGE thought, that judging by the sections of

the ciliary muscle in myopia, the amount of accommodation in such eyes was less than in normal sighted eyes. The vitreous in myopes of over 15D. was rarely healthy, so that diseased vitreous he did not regard as unfavorable. He had operated on 17 eyes in patients whose ages ranged between 8 and 30. He practiced free needling of the anterior capsule followed by linear extraction; in one case detachment of the retina had come on 6 months after the operation.

MR. LANG had had 30 cases. In one case detachment of the retina came on after operation, but inasmuch as the same thing happened in the other untouched eye 3 months later, he did not think it important. In the last few years all needle insertions had been made through the sclero-corneal margin to avoid suppuration. He used atropine after the needling.

MR. TREACHER COLLINS had operated on 11 eyes. In one case the lens had become entirely absorbed after one needling only; the sight had not been made worse in any patient; it had been improved in all except one case in which there was central choroidal atrophy. All his patients had been entirely satisfied.

MR. CARGILL had operated in 6 cases.

MR. ADAMS FROST had done the operation on 24 eyes, the value of the operation lay in the fact that the higher the myopia the greater the reduction in it produced by operation. The questions he proposed before doing an operation in any case were: Did circumstances make the wearing of glasses undesirable? Was the vision likely to be good after operation without glasses? Would the patient be better off after operation when using glasses? The fewer operations the less the risk in any case. He used the sclero-corneal puncture in needling. As a rule, he thought both eyes should not be operated on.

MR. RAYNER BATTEN had operated on 13 eyes. He asked why the operation arrested the myopia? In one case in which the lens had cleared up rapidly after operation, he had noticed an increase in hypermetropia going on steadily for some months, he explained this by a definite shrinking of the eye going on steadily, but generally unnoticed, because of the opaque condition of the lens.

Messrs. Wray, Breuer, Critchett, Jessop, Stephenson, Lawford and Doyme also spoke.—*British Medical Journal.*